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TWO NEW SPECIES OF *DINOGAMASUS*, MITES FOUND ON CARPENTER BEES OF THE ORIENTAL TROPICS

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Two new species of mites, *Dinogamasus philippinensis* and *Dinogamasus piperi*, bear a strong resemblance to *Dinogamasus* (*Greenia* Oudemans, *Dolaea* Vitzthum) *perkinsi* (Oudemans), and may be designated as belonging to the *perkinsi* group. It is interesting to note that the new species were found on members of the same group of carpenter bees to which the host of *D. perkinsi* belongs. These carpenter bees, which are confined to the oriental tropics, differ from other mesotrichian bees especially in regard to the peculiar legs of the males; whereby Westwood originally established the subgenus *Platynopoda*. Ashmead has suggested that *Platynopoda* should be considered to be of generic rank, which doubtless should be done.

Dinogamasus perkinsi (Oudemans) was originally recorded from *Mesotrichia* (*Xylocopa*, *Koptorthosoma*) *tenuiscapa* (Westwood), from Java and India. It has been recorded by Vitzthum (1919) from *M. latipes* (Fabricius) and *M. tenuiscapa*, from East Indies, Cochin China, and Java; (specimens from Naturhistorischen Museum of Hamburg). Vitzthum (1930) also records *D. perkinsi* from *M. tenuiscapa* from Ceylon, from *M. latipes* from Ceylon, Sumatra, and Java, and also from *M. auripennis* (Lepeletier) from Sumatra.

I have found *D. perkinsi* only in the abdominal pouch of *M. latipes*, which specimens were from Trang, Siam, and from Buitenzorg and Soekaboemi, Java, and also in a subspecies of *latipes* from Depok and Buitenzorg, Java. The mite which I found in *M. tenuiscapa* (determined by Dr. T. D. A. Cockerell) is the new species, *D. piperi*, collected by C. V. Piper in India, 1911. *M. tenuiscapa* originally came from India. My determination of *D. perkinsi* was made upon comparison with a named specimen kindly sent me by Dr. Vitzthum, taken from *M. latipes*, from Java. Since there has been some confusion about the description of *perkinsi*, I am including camera lucida drawings of various structures for comparison with the two new species herein described. See Fig. 1.

Members of the *perkinsi* group have the following features in common:

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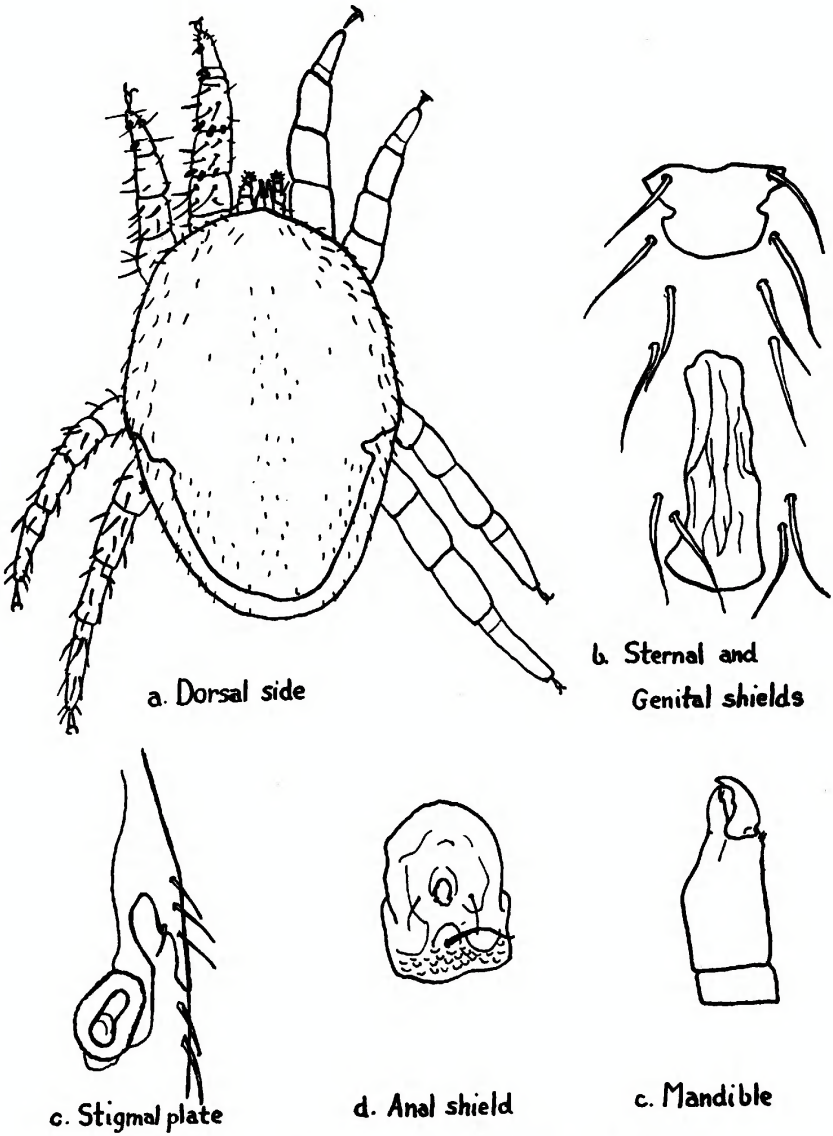

Fig. 1. *Dinogamasus perkinsi* (Oudemans), female.

Length: from 2 mm. to 3 mm. Dorsal shield has distinct, irregular, lateral notch just posterior to legs IV. Sternal shield is escutcheoned, often notched laterally. Anal shield has breadth to length, usually of 3 to 4; the posterior margin is usually as broad as the width of the shield through the anus; the lateral sides are almost parallel; the anal opening is placed very close to the center of shield, or nearer to the margin. Peritrematalia are rudimentary, or discontinuous, or prominent and fused with a projection of the dorsal shield. Fixed digit of mandibles has prominent tooth on cutting edge; length of fixed digit is about three-fourths that of the movable digit. Hairs ventral on legs I are unmodified and weak. Blunt cones on legs I vary on the different segments of the species of this group, hence they will be described for each species. The only blunt cones on legs II are on the tarsus: one outward near apex, one ventral near apex, the third distal and outward on the basitarsus.

KEY TO SEPARATE *Dinogamasus perkinsi, philippinensis,* AND *piperi*

1.—Body at least 2.4 mm. long; dorsal shield and posterior margin of body sparingly covered with fine short hairs; peritrematalium continuous with dorsal shield; second pair of sternal hairs placed lateral to sternal shield but not on the shield; all coxal spines similar ..... 2.

Body not over 2.4 mm. long; dorsal shield and entire margin of body covered with moderately long hairs; peritrematalium not continuous with dorsal shield; second pair of sternal hairs placed on sternal shield near the posterior corners; coxal spines not uniform in size and shape ..... *philippinensis.*

2.—Dorsal shield not entirely covering posterior lateral margins of body; patella I and tibia I with three blunt cones basal ..... *perkinsi.*

Dorsal shield practically covering body except at notch; patella I with six blunt cones; tibia I with three basal cones and one midway-outer cone .... *piperi.*

Dinogamasus philippinensis, new species

FEMALE.—Smaller than *D. perkinsi.* Length: 2000μ–2300μ. Width: 1260μ–1400μ. Legs: I, 1460μ–1540μ; II, 1300μ–1420μ; III, 1500μ–1720μ; IV, 1780μ–1900μ.

Notch in dorsal shield, just posterior to coxæ IV, is more pronounced than that of *D. perkinsi.* Four or five rows of moderately long soft hairs surround the body extending irregularly on to the dorsal shield, except at the extreme anterior and posterior ends. Similar hairs extend through the median region, grouped in pairs or in small clusters of six or ten, followed by a more regular grouping of the hairs, three or four abreast, in the posterior third of the median area. (Similar hairs on *perkinsi* are very short.) An irregular projection of the dorsal shield extends on to the ventral side close to legs II. See Fig. 2.

Sternal shield: scaled; rectangular; wider than long (340μ×220μ); margin irregular, especially the lateral margins. Second pair of sternal hairs are on the shield (those of *perkinsi* are on the soft skin).

Genital shield: 600μ long, 300μ wide at posterior end, and 100μ at anterior end. (The genital shield of *perkinsi* is also 600μ long but is narrow, the sides almost parallel, measuring 200μ at the posterior end and 160μ at the anterior.)

Anal shield is very similar to that of *perkinsi;* it measures 400μ in length, 300μ in width. There is a decided broadening of the posterior margin of the shield.

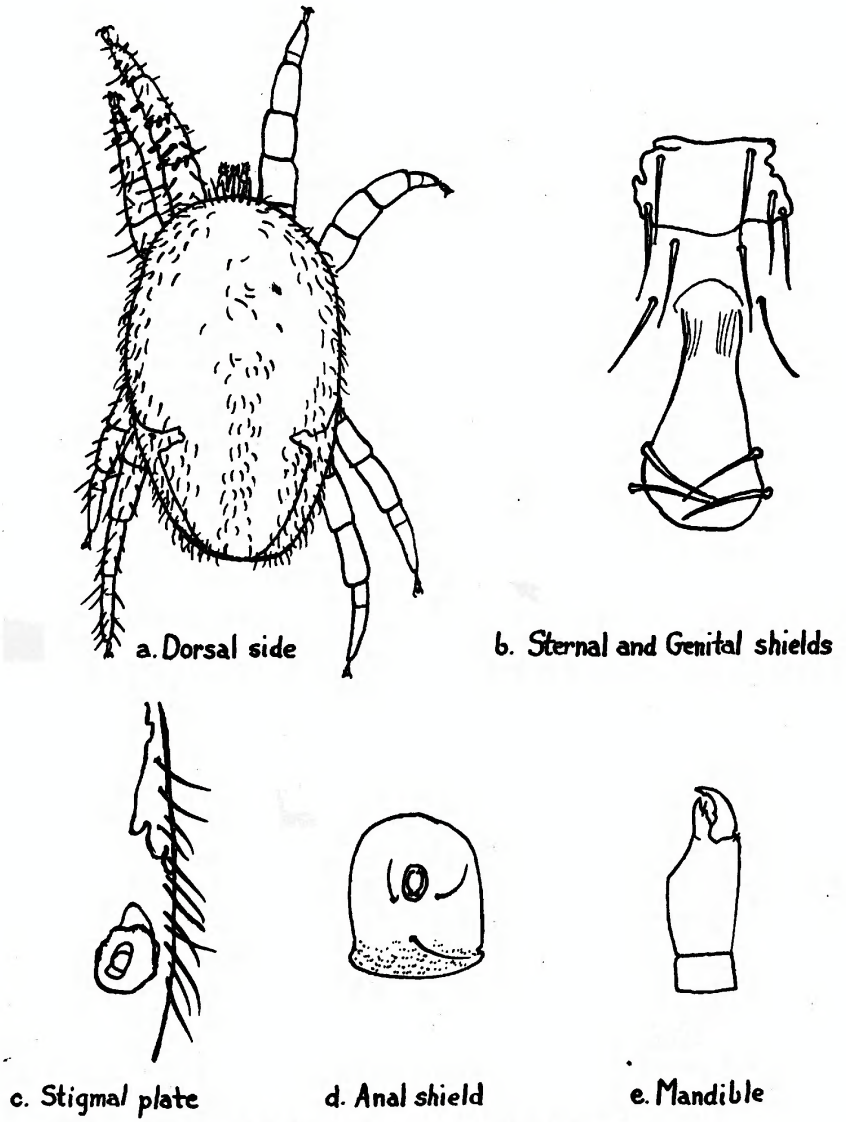

Fig. 2. *Dinogamasus philippinensis*, female.

The stigmal plate is 180μ×140μ. The peritrematalium in the form of a triangle extends only 60μ anteriorly. See Fig. 2c.

Coxal spines on legs I and II are enlarged and taper to a fine point, the anterior spine on leg II is less stout than the others; the spines on coxa III are slender and sharply pointed, the anterior one being very small. The structure on coxa IV is not unlike the other unmodified hairs on that leg.

The three basal cones on the dorsal side of patella I are stronger than those on the same segment of *perkinsi;* there is also a cone midway on the outer side which is represented on *perkinsi* by a sharp spine. The four central dorsal hairs are heavy, with occasional blunt tip; they suggest a transition stage to the formation of blunt cones.

The inner of the three basal cones on tibia I is quite weak; the structure on the outer surface of the same segment is usually a blunt cone, sometimes it is a blunt spine.

There are too blunt basal cones on tarsus I, and on the outer side there is a short, curved, blunt cone midway between the basal cone and the apex.

Legs II are very similar to those of *perkinsi*, tarsus II having one blunt cone outward on basitarsus, and two somewhat shorter blunt cones ventral near the apex of the segment.

HABITAT.—Abdominal pouch of *M. latipes* from Cuernos Mountains, Negros, Philippine Islands; C. F. Baker, collector. (Specimen of bee in Dr. Cockerell's collection.)

HOLOTYPE.—At The American Museum of Natural History, New York City.

Dinogamasus piperi, new species

FEMALE.—Length: 2500μ–2600μ. Width: 1600μ–1700μ. Legs: I, 1700μ; II, 1660μ; III, 1800μ; IV, 2200μ.

This species which is very similar to *D. perkinsi* can be distinguished from it readily upon examination of the cones on legs I. Patella I has six well-chitinized short blunt cones, three of which are basal, one midway-outer, the other two are spaced somewhat evenly on the median dorsal region of the segment. Tibia I has the usual three basal cones and also a midway-outer cone. Tarsus I has the usual three cones: two on the basitarsus, and an outwardly directed one nearer to the apex. A dorsal-apical region, thinly chitinized, on the tarsus, bears many fine soft hairs. Coxal spines, swollen at the base, taper abruptly to a sharp needle-like point; all are very much alike except that the anterior spine is usually smaller than the posterior one on each coxa. See Fig. 3.

There is not the more or less extensive margin of soft skin around the posterior part of the dorsal shield. The shield covers almost the entire back; thus the lateral irregular notch in the region above legs IV may be difficult to detect. On the back are scattered a very few short hairs. The very few hairs on the ventral posterior region are likewise very short. Slightly longer hairs are found anteriorly on the margin of the body.

Sternal shield, scaled, bears the first pair of sternal hairs near the acute anterior corners. The second pair flanks the rounding posterior third of the shield. All four pairs of sternal hairs and the genital hairs are robust and taper to a very long fine point. The shield measures 360μ along the anterior margin; it is 260μ wide between the second pair of hairs; the length is 280μ. See Fig. 3*b*.

Genital shield: 280μ at greatest width near rounding posterior margin; 620μ long.

Anal shield: 340μ at greatest width, which is through anus; 260μ wide at posterior margin; 440μ long. Anus above center of shield. Unpaired hair is slightly nearer to the posterior margin than to the anus.

Peritrematalium is narrow and extends forward meeting the over-cupping dorsal shield.

HABITAT.—Abdominal pouch of *M. tenuiscapa* (Westwood), from India; C. V. Piper, collector; (National Museum specimen).

HOLOTYPE.—At The American Museum of Natural History, New York City.

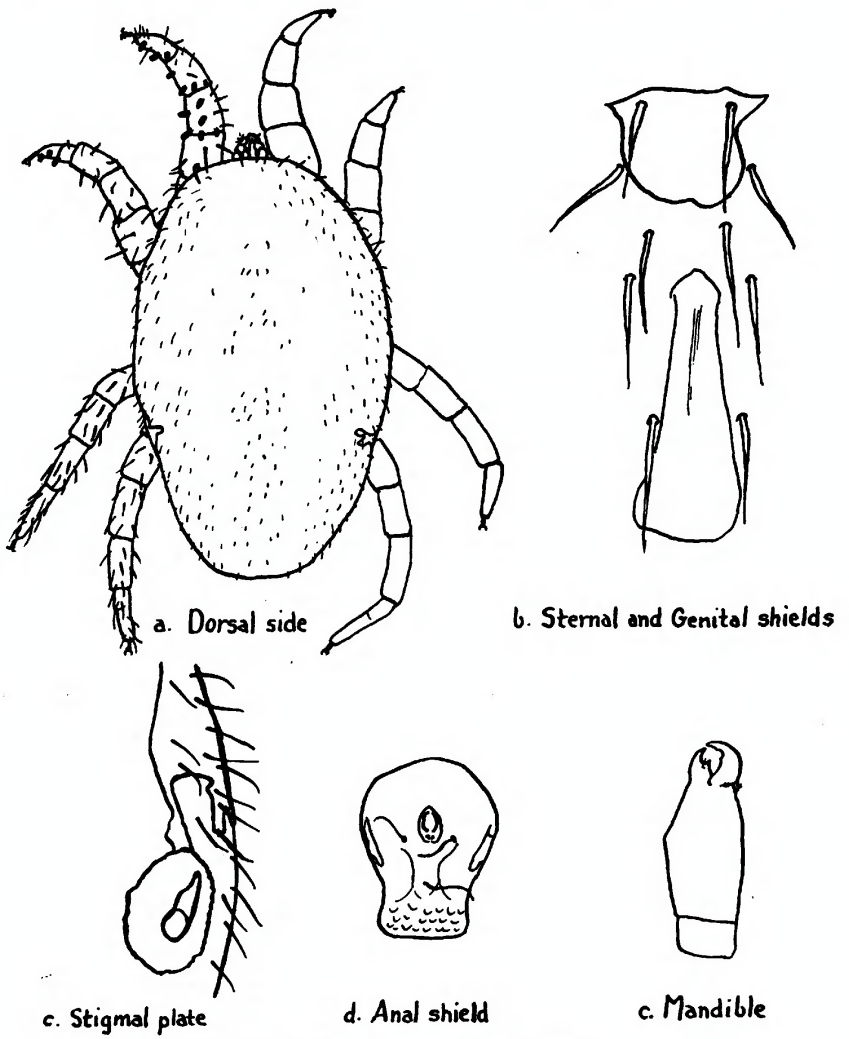

Fig. 3. *Dinogamasus piperi*, female.